

Appln No. 10/632,347

Reply to Office Action of January 10, 2006

REMARKS/ARGUMENTS

Summary of Office action

In an Office action dated January 10, 2006, the following objections and rejections were made:

- claim 12 was objected to as being in improper form because a multiple dependent claim is made to claim 10 and 11; and
- claims 1 - 14 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent 6,122,537 to Schmidt (the Schmidt patent).

Objection to claim 12

Claim 12 has been amended as suggested in the Office action. Therefore, Applicants respectfully submit that the objection to claim 12 has been overcome.

Rejection of claims 1 - 14

The rejection

The Office action contains the following rejection:

Claims 1-14 are rejected under 35 U.S.C. §102(b) as being anticipated by Schmidt (6122537). Schmidt discloses oscillators, a transmitter & transmission antenna (fig 13, 2), a receiver & receiver antenna (fig 13, 4), a diode detector (fig 7) connected to receiver antennae, one common transmitting/receiving antenna (col 6, ln 47-48), an electromagnetic signal, monitoring of amplitude changes with respect to a beating heart (col 5, ln 17-30), the heart rate of a test person with respiration stopped (fig 5), the spectrum of the heart signal reflected by a breathing person (fig 6), transmission of a frequency in the range of 100-MHz through 10-GHz (col 3, ln 64-65), wherein the said range can still be received through dense debris (col 2, ln 1-2), a low-pass and high-pass filter (fig 8a, 8b), and the application of digital signal processing (fig 3).

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The Schmidt patent

The Schmidt patent relates to a "Method of and Apparatus for Detecting Vital Functions of Living Bodies". The portion of the Schmidt patent entitled "Background of the Invention" provides the following explanation of the invention:

The inventors found that living bodies and therefore also human living bodies surprisingly influence high-frequency electromagnetic signals by virtue of their most important vital functions, that is to say their heartbeat and their respiration activity.

Those vital functions generally take place within known frequency ranges, which with the human heart rate can be from about 0.5 through 3.4 Hz and normally are about 1 through 2 Hz and in the case of respiration can extend between 0.1 and 1.5 Hz.

The radiation experienced phase modulation which added side bands displaced by some Hertz to the high-frequency carrier signal.
(Schmidt, Col. 1, Ln. 11 - Col. 2, Ln. 7)

The modulation of the received signal is also described as being "phase or frequency modulated" in the section entitled "Detailed Description of Preferred Embodiments" (Schmidt, Col. 4, Ln. 53).

The Schmidt patent is similar to a number of prior art systems that detect modulations of the phase and/or frequency of a reflected microwave signal caused by physical motion of the chest. This approach has been shown to provide a measurement of pulse rate and/or respiration rate without any physical contact (such techniques are occasionally referred to as "radar" or "Doppler radar" methods).

Claim 1

Applicants respectfully submit that the Schmidt patent extracts information from the phase or frequency modulation of the received signal. Therefore, the Schmidt patent cannot anticipate the following combination from claim 1:

1. A remote-detection system for monitoring changes in complex impedance associated with physiological activity of a subject, comprising:

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a source containing an oscillator configured to illuminate at least a portion of the subject with an electromagnetic signal beam; and

a receiver configured to receive reflections of the electromagnetic signal beam from the subject;

a detector connected to the receiver and configured to extract from the reflected signal beam variations in amplitude that are indicative of time dependent variations in the complex impedance of the illuminated portion of the subject.

Claims 2, 4, 6 and 7

Claims 2, 4, 6 and 7 depend from claim 1. Therefore, Applicants respectfully submit that claims 2, 4, 6 and 7 are allowable for reasons including that they depend from an allowable base claim.

Claim 9

For reasons similar to those stated above with respect to claim 1, Applicants respectfully submit that the Schmidt patent does not anticipate the following combination from claim 9:

9. A method of observing changes in the complex impedance of a subject associated with physiological activity, comprising:

illuminating at least a portion of the subject with an electromagnetic signal beam; and

extracting from the reflected signal a signal indicative of the changes in the amplitude of the electromagnetic signal reflected by the subject that are associated with changes in the complex impedance of the illuminated portion of the subject.

Claims 10, 11 and 12

Claims 10, 11 and 12 depend from claim 9. Therefore, Applicants respectfully submit that claims 10, 11 and 12 are allowable for reasons including that they depend from an allowable base claim.

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New Claims 15 - 18

Applicants respectfully submit that new claims 15 - 18 are allowable for reasons including that they depend from allowable base claims.

Conclusion

In view of the foregoing amendment and response, it is believed that the application is in condition for allowance. Therefore, Applicants request the prompt issuance of a Notice of Allowability.

If any questions remain regarding the allowability of the application, Applicants request that the Examiner contact the undersigned at the number listed below.

The Commissioner is hereby authorized to charge any fees under 37 CFR 1.16 and 1.17 which may be required by this paper to Deposit Account No. 03-1728. Please show our docket number with any charge or credit to our Deposit Account.

Respectfully submitted,
CHRISTIE, PARKER & HALE, LLP

By _____
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